Sustainable Urban Site Design

Certification Systems

Awaji Landscape Planning & Horticulture Academy

May 2, 2008

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Lecture Outline

- sustainable design certification
- NGOs leading sustainability
  - LEED - U.S. Green Building Council
  - Sustainable Sites Initiative - multiple NGO
- Examples
- Discussion

- NGO
- U.S. national organization
- architecture focus
- “bio-neer” pioneer in biology/ecology

LEED
Green Building Rating Systems

- Leadership in Energy and Environmental Design
- using tools and performance criteria
- building and development checklist
- started in U.S., now 41 countries

LEED Performance Checklist

- sustainable site development
- water savings
- energy efficiency and atmosphere
- materials selection
- indoor environmental quality

LEED Rating

- Certified
- Silver
- Gold
- Platinum

LEED Rating Systems

Bronx Library

(New York City)

New Construction Certification

score: 34
rating: Silver

Island Wood

- Gold rating

University of Washington - Merrill Hall

- LEED rating: Silver (first LEED on campus)

U of WA - Merrill Hall

- passive solar atrium

City of Bainbridge Island, City Hall

Bainbridge Island City Hall
Bainbridge Island, WA

Miller|Hull designed this 24,000 sf City Hall for the newly formed City of Bainbridge Island. The building consolidates the Executive/Legislative, Finance and Administration, Planning & Community Development, and Public Works Departments.

By placing the building on the street we provided an opportunity to create a civic green between the new City Hall and the existing Bainbridge Performing Arts Facility. In addition, several urban design challenges will be met, including the creation of a strong link from

Awards
2000 AIA Seattle Chapter Honor Award

2000 AIA Washington State Civic Design Honor Award

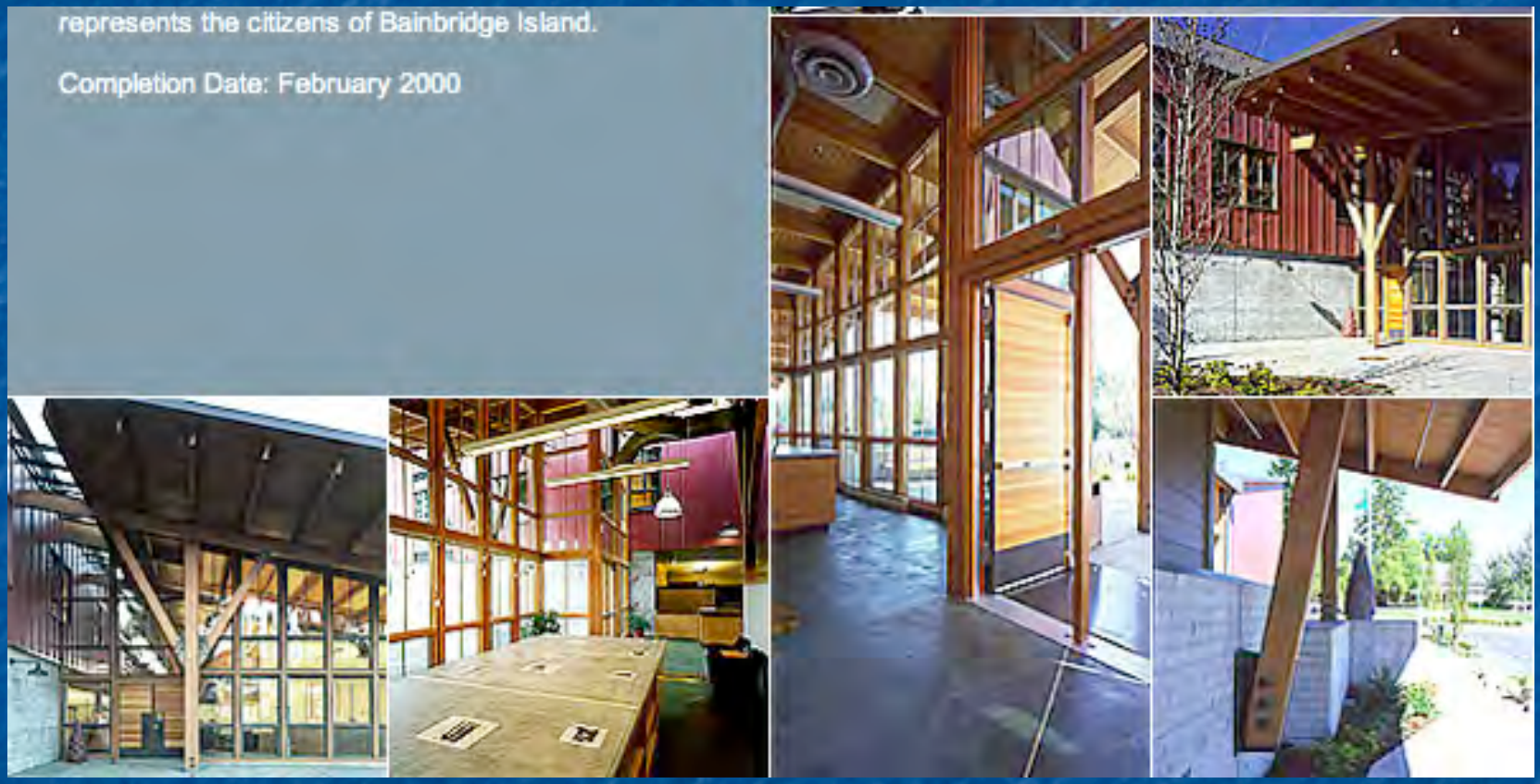
Earth Day 2000 National AIA Top Ten Green Award

- LEED Rating: Certified

City of Bainbridge Island, City Hall

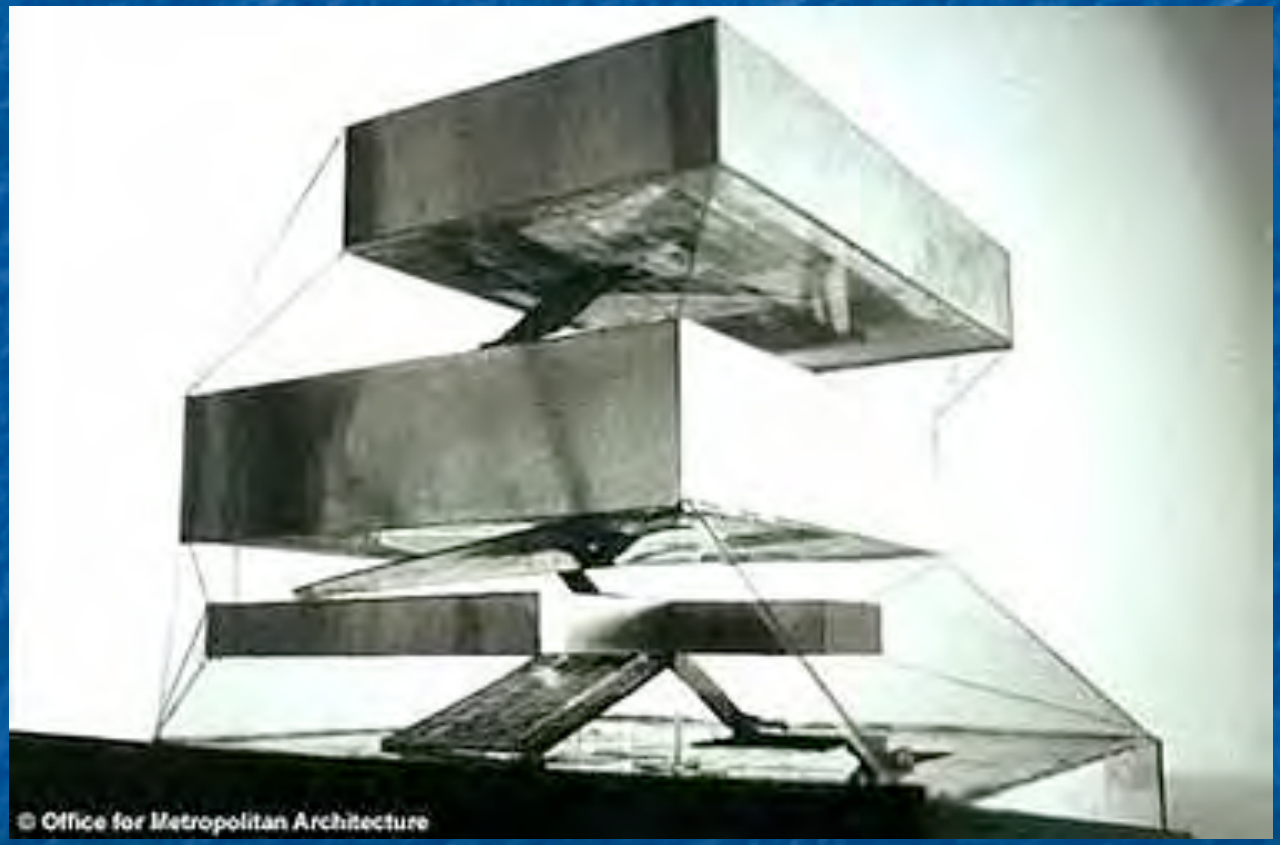
represents the citizens of Bainbridge Island.

Completion Date: February 2000



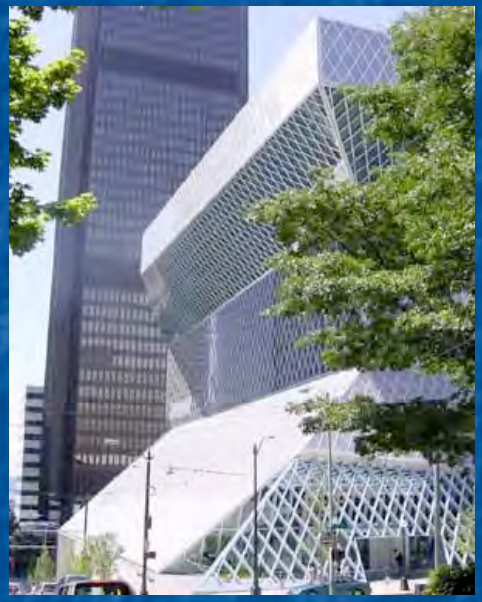
- LEED Rating: Certified

City of Seattle, Public Library



- LEED rating: Silver

City of Seattle, Public Library



- LEED rating: Silver

City of Seattle, Public Library

- LEED rating: Silver

LEED Certification - Summary

- Performance Criteria = design score
- Rating Levels: Silver, Gold, Platinum
- Adopted! Incentive not regulation
- Design certification - designer certified!

This class!
Sustainable Site Design

- LEED certification - not too good for landscape and outdoors
- Sustainable Sites Initiative
  start 2006
- Expert teams - what are we doing?

Sustainable Site Certification

- approved by USGBC

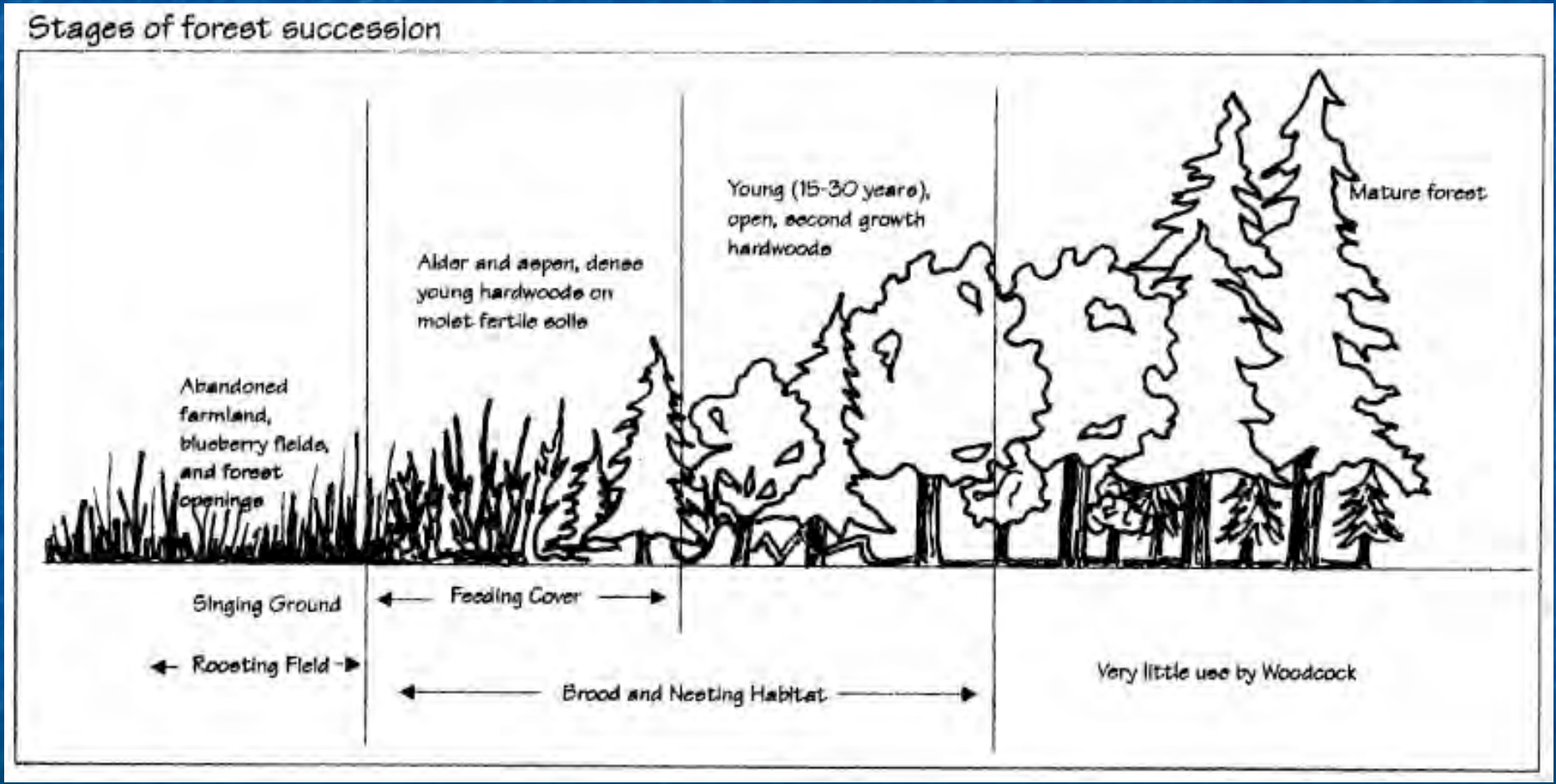
Team Discussion

- Homework:
- Other design certification systems?
- Japan?

Sustainable Site Certification

- approved by USGBC

Design “Resilience”



- natural systems - succession

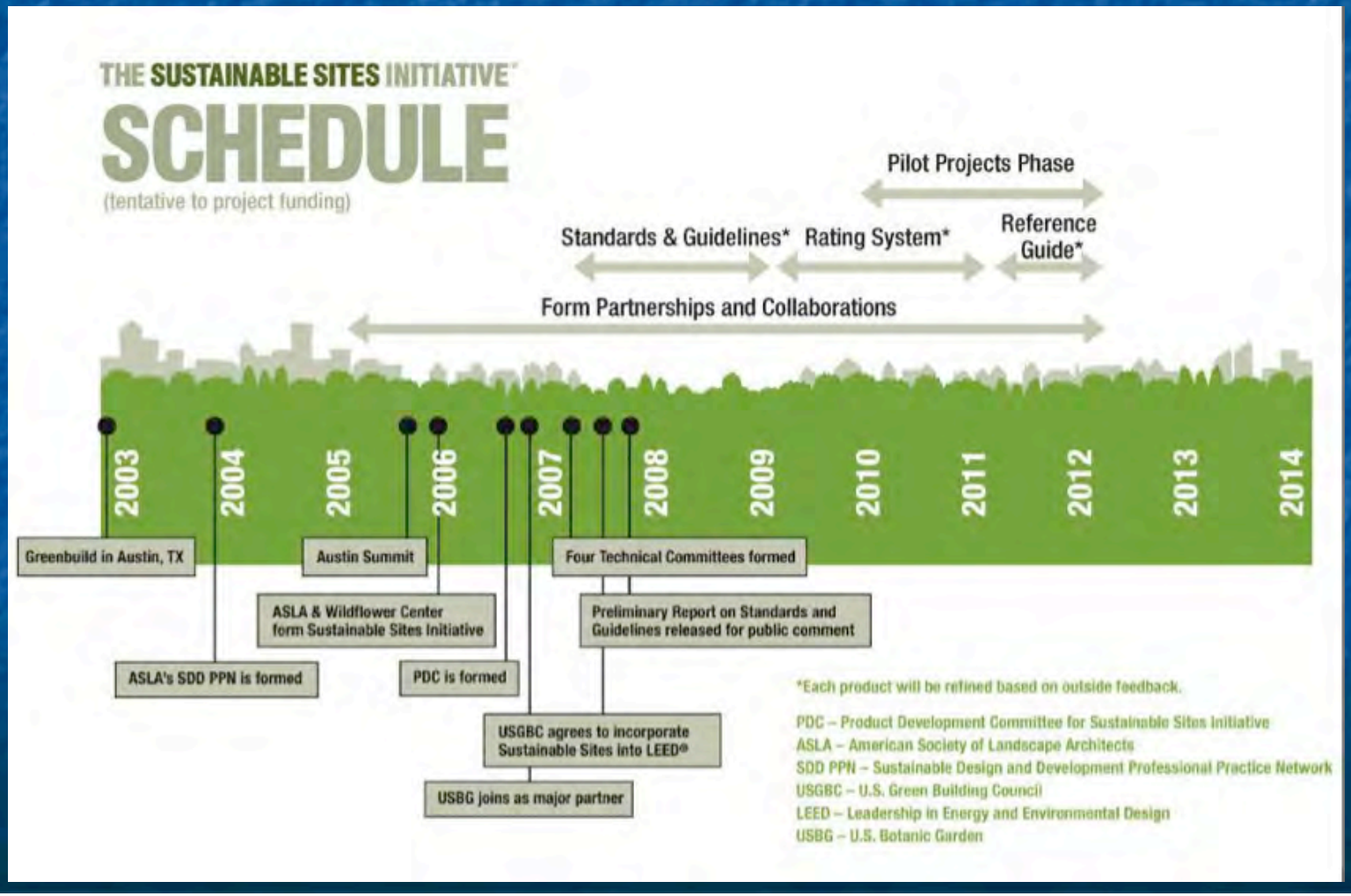
THE SUSTAINABLE SITES INITIATIVE™

The Sustainable Sites Initiative

The Sustainable Sites Initiative is an interdisciplinary partnership between the American Society of Landscape Architects, the Lady Bird Johnson Wildflower Center, the United States Botanic Garden and a diverse group of stakeholder organizations to develop guidelines and standards for landscape sustainability. The motivation behind this initiative stems from the desire to protect and enhance the ability of landscapes to provide services such as climate regulation, clean air and water, and improved quality of life. Sustainable Sites™ is a cooperative effort with the intention of supplementing existing green building and landscape guidelines as well as becoming a stand-alone tool for site sustainability.

Sustainable Sites Initiative

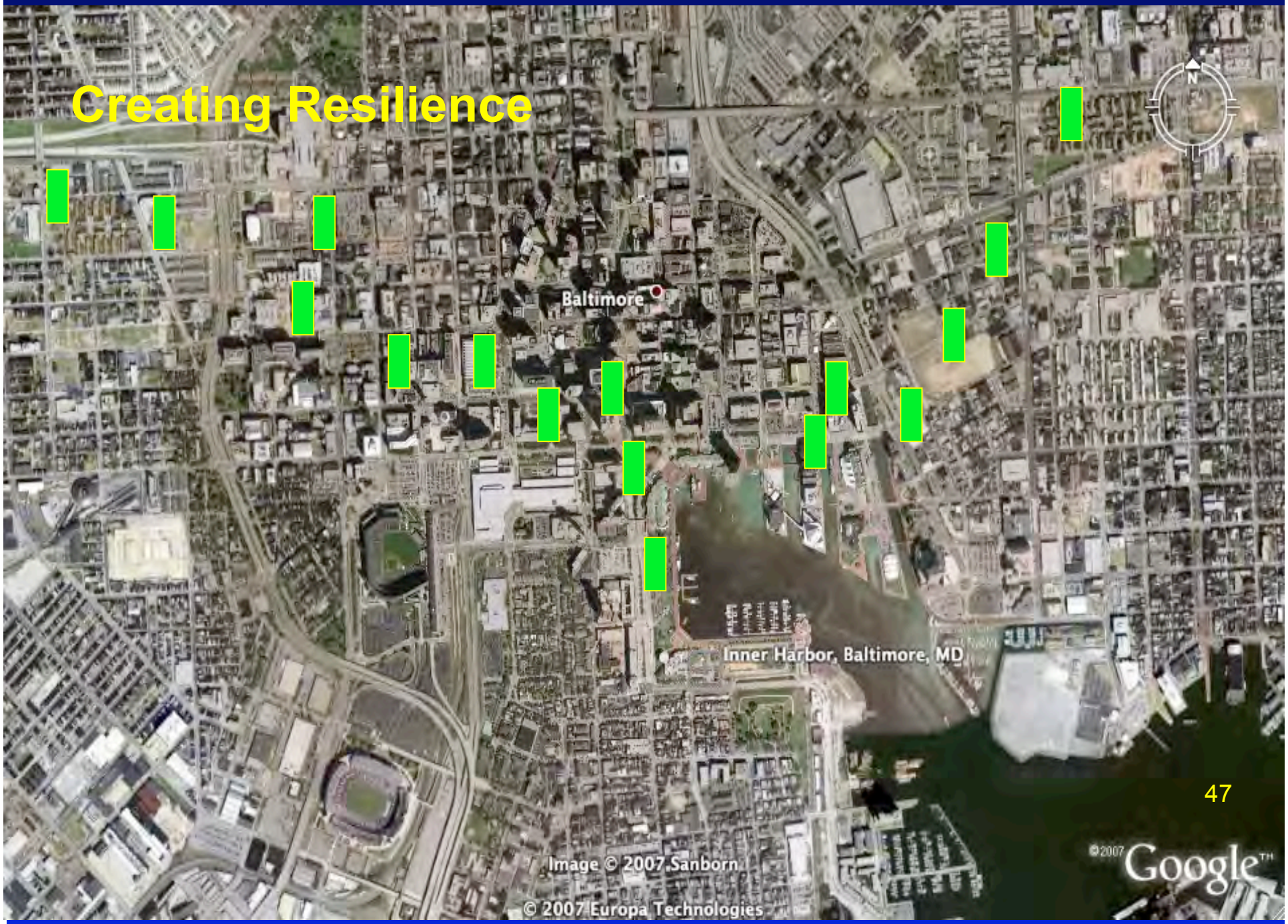
- LEED certification companion



Participants

- NGOs
  - American Society of Landscape Architects
  - Lady Bird Johnson National Wildflower Center
  - U.S. Botanic Garden
- Local, state & federal government
- University scientists

Creating Resilience

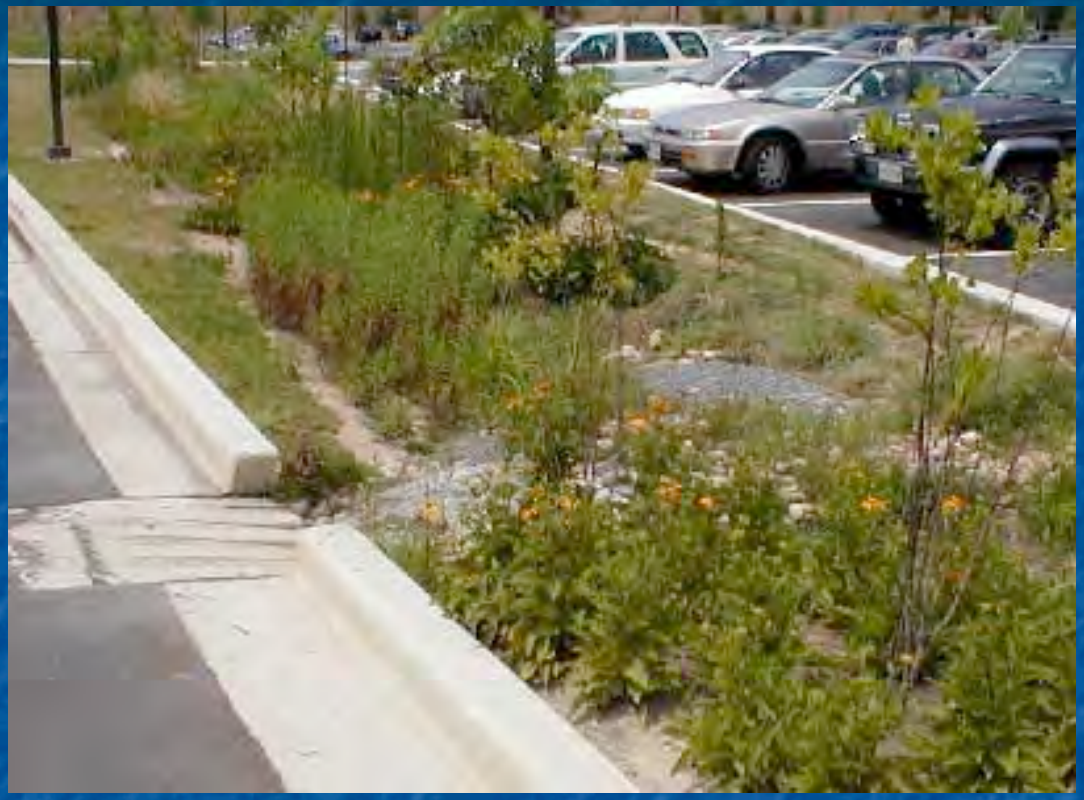


Hydrology

Water is a limited resource that is essential to all life. Under natural conditions, rain falls on vegetation, drips and filters into the soil which recharges ground water supplies and slowly flows into creeks and rivers. In contrast, human-altered landscapes are often designed to treat water as a waste product, with the goal of moving it offsite as quickly as possible. Conventional drainage systems typically deliver larger volumes of water to streams in shorter amounts of time, leading to increased downstream flooding, erosion, water quality degradation and fewer opportunities to enjoy the aesthetic and recreational benefits of streams and lakes. The effects of these human modifications on landscapes can affect regional and even global ecology.

Urban Hydrology

- slow and retain stormwater



- bio-retention - bio-swale "green infrastructure"

- gray infrastructure

Soils

Soils are essential for the production of food, timber, medicines, fibers and other raw materials. Healthy soils allow rainwater to penetrate, preventing excess runoff, sedimentation, erosion and flooding. Soils also help clean, store and recharge ground water. By storing water and slowing the delivery of water to plants, healthy soils play a significant role in vegetation health as well.

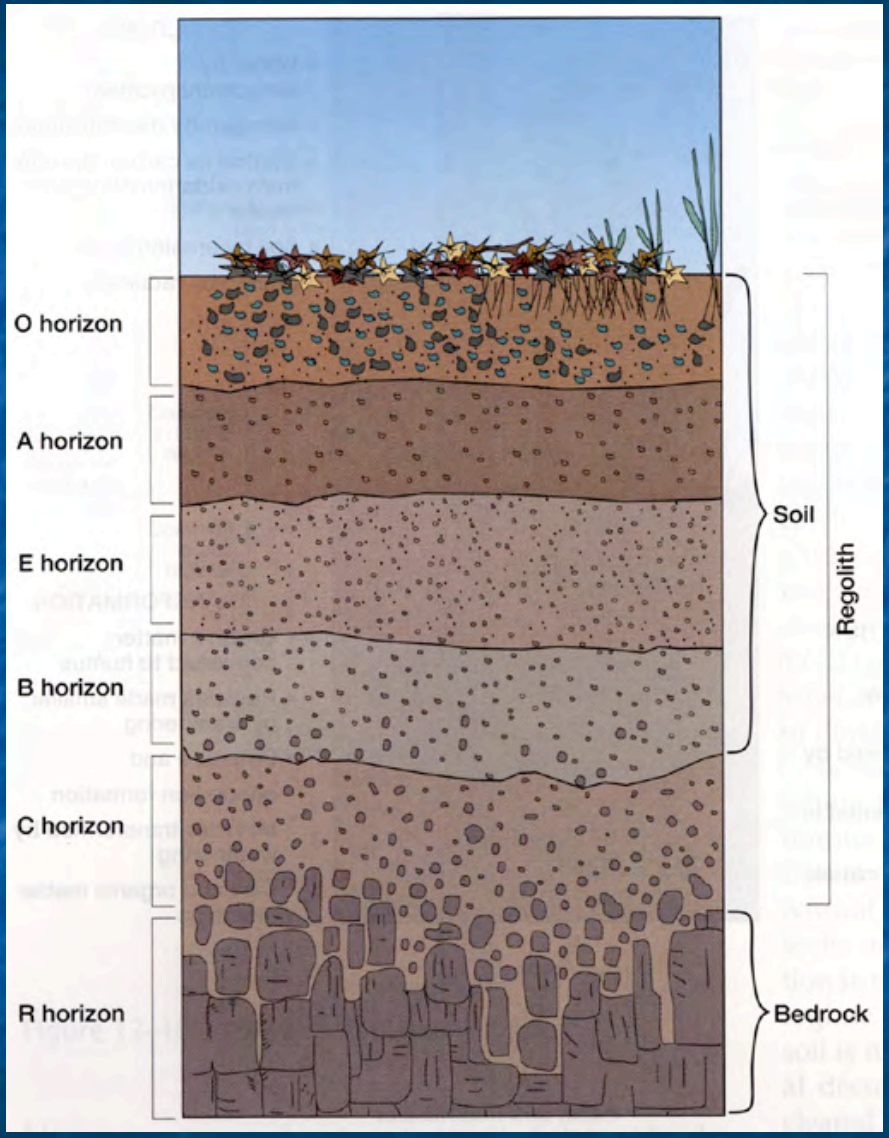
Water and air pollutants are removed or transformed into less harmful materials in the soil. For example, clay soil particles and soil organic matter can attract and hold chemicals present in water infiltrating the soil. In addition, soil accommodates microbes that break down or convert pollutants into more benign substances.

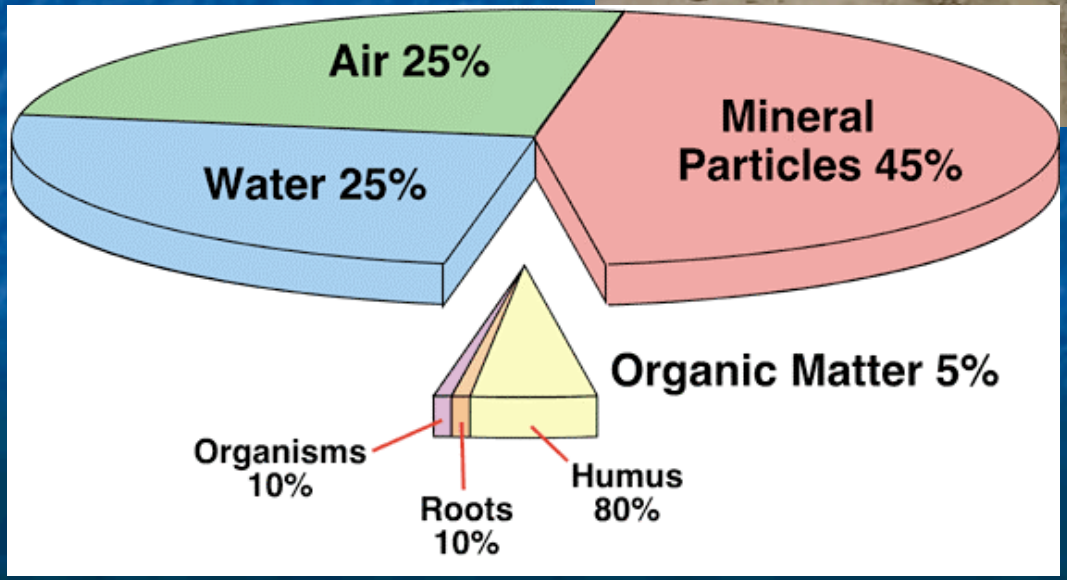
Did you know?

Sediment runoff rates from construction sites can be up to 20 times greater than agricultural sediment loss rates and 1000-2000 greater than those of forested lands.[1]

Soils serve as habitat for a diverse range of organisms such as plants, worms, insects, arthropods, bacteria, fungi, protozoa, and nematodes. The "soil food web" decomposes organic matter, stores and cycles nutrients, maintains soil structure and stability and filters pollutants.

- soil structure




Air 25%
Water 25%
Mineral Particles 45%
Organic Matter 5%
Organisms 10%
Roots 10%
Humus 80%

- soil damage

Materials

Materials are natural resources that have been extracted, manufactured and/or processed for human use. They are a necessary component of almost every project and should be considered when thinking about sustainability.

Current Material Practices

Excessive material use, due to structural over-design and misperceptions of increased safety, and **improper materials management** cause needless waste and require more resources, production and transport. Materials commonly viewed as "waste" can often be reused or recycled to reduce the need for additional resources, as well as reducing landfill volumes.

Did you know?

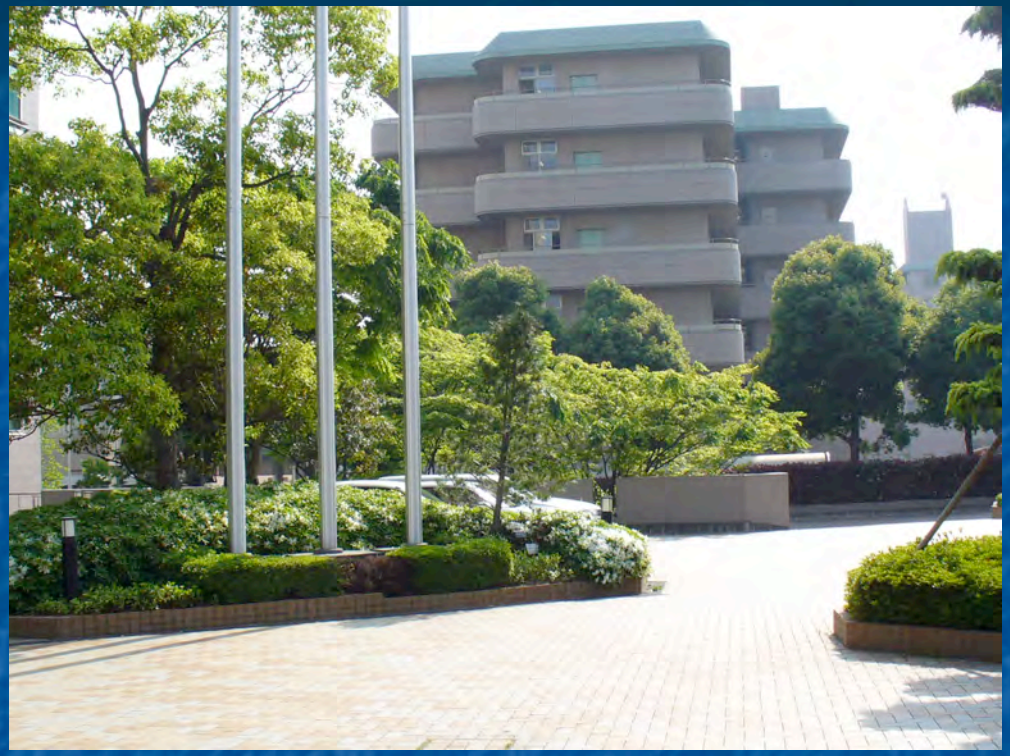
The widespread use of materials with increased reflectivity can result in localized average air temperature decreases of up to 7.2° F.[1]

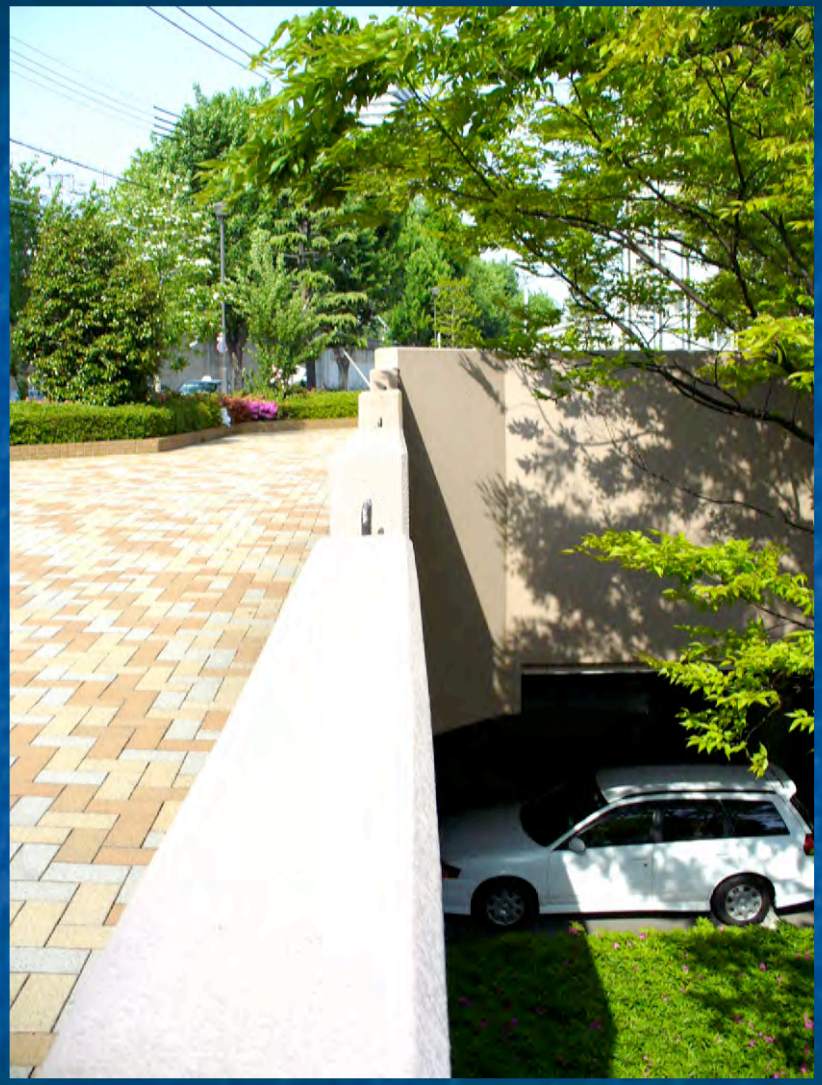
In 1996, construction and development in the U.S. generated almost 136 million tons of building-related waste. Only 20 to 30 percent of that was recycled.[2]

Yard and landscape trimmings contribute approximately 32 million tons to the municipal waste stream, about 13 percent of total municipal waste in the nation.[3]

In 2004 cement production created carbon

- parking surfaces - pervious paving





- parking structure with garden plaza

- solar sidewalk - Kobe

Vegetation

Plants provide a livable atmosphere and moderate climate by regulating the earth's oxygen/carbon dioxide balance and filtering pollutants from air and water. During photosynthesis, plants take in carbon dioxide, water and light to produce carbohydrates, a food for growth, and oxygen. Vegetation (along with soil biota) can convert and recycle human waste by processing, removing, transforming and storing pollutants from air and water. For example, plants can filter gaseous pollutants from the air by absorption through leaf stomata and bark pores.

Current Vegetation Practices

Did you know?

According to one study, in 1991 trees in the Chicago area removed as much as 234 tons of particulate matter, 210 tons of ozone, 93 tons of sulfur dioxide, and 17 tons of carbon monoxide from the air.[1]

A study of five US cities found that urban trees can contribute to substantial annual energy savings. For example, annual cooling and heating savings from shading and windbreak benefits reached $553,000 in Berkeley, CA, and $187,000 in Cheyenne, WY.[2]

- diversity and habitat

- cooling structures - less heat island

Human Well-being

Plants and natural elements provide many environmental benefits and improve our quality of life and well being. Sites can use natural elements in designs that provide human benefits as well as benefits to the environment.

Current Landscape Practices

Site design sometimes ignores the human benefits of healthy, green environments and fails to provide opportunities for physical activity, restorative and aesthetic experiences and social interaction. In site design, natural elements are often viewed only as a way to beautify structures or the built environment. However, research indicates that vegetation plays a much more important role in human health and well-being

Did you know?

Daily moderate activity by individuals decreases the incidence of such chronic diseases as heart disease, diabetes and high blood pressure. Improved health generates significant savings in health care costs.[1]

A series of studies of inner-city neighborhoods finds that green spaces with trees contribute to healthier, more supportive patterns of interrelations among residents, including greater sharing of resources.[2]

parks, open spaces & trails - recreation


community gardens - social places

Discussion Teams

- Sustainable Sites Initiative
- expert teams - how will make score?
  - hydrology
  - soils
  - materials
  - vegetation
  - human well-being

Important Ideas!

- What?
  - Sustainability certification and ratings
- Who?
  - NGOs
- Why?
  - urban sustainability & resilience
- How?
  - eco-design, green infrastructure

The End!